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Pre-flood hazard mitigation plan for the



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Pre-Flood Hazard Mitigation Plan

for the

City of Laurel,

City of Billings

and Yellowstone County

Montana

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August, 1983

Prepared by the

Department of Natural Resources and Conservation

Floodplain Management Section

In Cooperation with the
Cities of Billings and Laurel
and Yellowstone County

Introduction

Purpose

The purposes of this Pre-Flood Hazard Mitigation Plan are:

- a. to identify general flood hazards in the community,
- b. to describe existing efforts to reduce flood damages in identified areas,
- c. to guide and encourage local community officials in taking further action as may be reasonably expected to enhance mitigation efforts,
- d. to identify and support applications for financial assistance to implement ideas and suggestions consistent with community objectives which will reduce flood damages.

Scope

This plan identifies opportunities to reduce future damages from the flooding sources identified in the Laurel, Billings and Yellowstone County Flood Insurance Studies produced by the Federal Emergency Management Agency (FEMA). The plan takes a comprehensive look at what has already been done to reduce flood damages and develops suggestions of action that can be taken to reduce the physical and monetary effects of future floods.

Funding

The funding source for the plan was provided under the State Assistance Program (SAP) grant administered by the Federal Emergency Management Agency (FEMA). The SAP grant allows the Floodplain Management Section of the Department of Natural Resources and Conservation (DNRC) to assist with local community efforts in reducing future flood losses.

Authority

Authority for the cities of Laurel and Billings and Yellowstone County to guide future development in flood-prone areas is provided by:

Laurel City Ordinance Number: 720

Billings City Ordinance Number: 4322

Yellowstone County Resolution Effective: September 8, 1981

The Montana Floodplain and Floodway Management Act (MCA 76-5)

The National Flood Insurance Act of 1968

The Flood Disaster Protection Act of 1973

Definitions

The following definitions are offered as a guide toward better understanding the similarities between the concepts discussed in this plan.

Hazard Mitigation - A plan "to alleviate by softening and making less severe the effects of a major disaster or emergency and of future disaster in the affected areas, including reduction or avoidance. Hazard mitigation can reduce the severity of the effects of the flood emergency on people and property by reducing the cause or occurrence of the hazard; reducing exposure to the hazard; or reducing the effects through preparedness, response and recovery measures. Hazard mitigation is a management strategy in which current actions and expenditures to reduce the occurrence or severity of potential flood disasters are balanced with potential losses from future floods."

Floodplain Management - A comprehensive approach "To reduce the damaging effects of floods, preserve and enhance natural values and provide for optimal use of land and water resources within the floodplain. Its goal is to strike a balance between the values obtainable from the use of floodplains and the potential losses to individuals and society arising from such use."

Emergency Preparedness - A process to "reduce the vulnerability of people and communities of this state to damage, injury, and loss of life and property resulting from natural or man-made catastrophies."

Flood - "A general and temporary condition of partial or complete inundation of normally dry land areas from (a) the overflow of streams, rivers, or other inland water bodies, or (b) the unusual and rapid accumulations or runoff of surface waters from any source.

Identification of Flood Problem

The flooding problem in Laurel appears to be the inability of the numerous irrigation ditches that are in the area to convey runoff from serious storms and snowmelt.

Flooding on the Yellowstone River and Clarks Fork Yellowstone River is usually attributed to a combination of rapid snowmelt and high rainfall runoff. Streamflow normally follows a seasonal pattern, with low discharge during the Winter.

Beginning in late February and continuing through April, melting of valley snow results in a gradual rise in discharge. During May, June and early July, mountain snowmelt combined with rains can produce the highest discharges.

History of Flooding

Major floods of record on the Yellowstone River occurred in 1918, 1943, 1944, 1967, 1974 and 1975. Major floods of record occurred on Alkali Creek, Canyon Creek, and Cove Creek in June 1937 and July 1923. Blue Creek flooded severely in 1978.

The June 1918 flood on the Yellowstone River had an estimated frequency equal to a 100-year event, with a discharge of 80,000 cubic feet per second (cfs). The most recent flood was in 1975 with a discharge of 64,100 cfs, about a 35-year frequency.

Flood Protection Measures

Flood protection measures in the Yellowstone County area (including the cities of Laurel and Billings) appear to be limited to the construction of local levees to protect specific areas. Usually, at least 1-day of warning of large floods can be anticipated on the Yellowstone River.

A bypass channel was completed on the Alkali Creek in 1977 to protect the area downstream of U.S. Highway 87 near Billings (County Fairground and the Metra).

Levees have also been placed around the City Wastewater Treatment plant at the mouth of Alkali Creek protecting against the 500-year flood.

Bank shaping and rock/concrete riprap has been completed along much of the Yellowstone River.

The cities of Laurel and Billings and Yellowstone County are in the Regular Phase of the National Flood Insurance Program and are enforcing comprehensive flood damage reduction regulations.

Emergency Preparedness

Yellowstone County's Emergency Operations Plan has been in place since 1962 and has been updated many times. The last update was in 1977 and is in revision at this time to be completed in 1984. All hazards affecting the county are addressed in the general operating annexes outlining general responsibilities. Short checklists contain more detailed instructions. The Emergency Warning Plan supplements the Operations Plan detailing out specific warning responsibilities for the 24-hour warning points in time of natural or man-made disasters. Other supplemental plans are Resource Manual (to locate emergency resources) and the Hazardous Material/Evacuation Plan to be completed yet in 1983.

Recommended Mitigation Measures

These recommendations have been developed with assistance from local community officials. They are not required actions. Rather, it is strongly suggested that when achievable, these recommendations be implemented.

Long Term Mitigation Solutions

- a. Increase the public's awareness of flood hazards and correct construction practices. Elevate their knowledge of the flood-prone areas and describe techniques to reduce flood damages to existing structures. Reinforce the purchase of Federal Flood Insurance as a way of reducing the economic impact of a flood disaster.
- b. Continue to enforce the flood damage reduction regulations for new construction and substantial improvements in flood-prone areas identified on the Flood Insurance Rate Maps (FIRM) and Flood Boundary and Floodway Maps (FLOODWAY) developed by FEMA.

Specific Areas of Concern

City of Laurel

NFIP Community Number: 300086

FIRM Panel Number: 0005C

Effective Date: January 6, 1983

Existing Mitigation

Flood Damage Reduction Regulations are being enforced by the Yellowstone County Disaster and Emergency Services Director.

Areas of Concern

These areas were identified by the community officials:

- City Water and Wastewater Treatment Plants (on the north side of the Yellowstone River east of U.S. Highway 310 and 212).

- The Cenex Oil Refinery (north side of the Yellowstone River and west of U.S. Highway 310 and 212).

Recommended Mitigation Measures

1. City Wastewater Treatment Plant

- a. Plans have been developed and approved for the construction of a completely new treatment plant that will be sufficiently floodproofed.

2. City Water Treatment Plant

- a. Determine if the survey datum used on the Black and Veatch plans are tied to U.S.G.S. datum.
- b. The plans for the City Water Treatment Plant were drawn using city survey datum. The 100-year flood elevation was developed using U.S.G.S datum. To convert the city datum to U.S.G.S. datum add 14.3 feet to the city datum.

The floor level of the treatment plant Pump Room is 3256.5. Add the 14.3 feet conversion equation, equals 3270.8 M.S.L.

The 100-year flood elevation at that site is 3270 M.S.L. giving the treatment plant approximately .8 feet of protection.

c. The City should determine the number of sandbags needed to protect any exterior ground level openings to a three foot level. The bags should be purchased and stored at that site.

3. Cennex Oil Refinery

There was concern that water intake pipes might be affected by the 100-year flood.

a. The water intake pipes are located in a building at the site of the water treatment plant. The pumps are operated by electric motors. A diesel engine at the same site will act as a backup to the electric motors. If this becomes inoperable, the company has access to the City Water Tower.

b. To better protect the water intake building, Cennex could seal the cinder block with an impermeable material or determine the number of sandbags needed to protect the building to a 3 foot level. The bags should be purchased and stored at the site.

Specific Areas of Concern

City of Billings

NFIP Community Number: 300085

FIRM Panel Number: 001-0020

Effective Date: January 2, 1981

Existing Mitigation

- Flood Damage Reduction Regulations apparently are being enforced by the City Building Official.
- Intermittent bank shaping and riprap along the Yellowstone River.
- Levees along the Wastewater Treatment Plant access road and treatment site location for protection against a 500-year flood.
- A bypass channel on the Alkali Creek to eliminate flooding in the County Fairgrounds.

Areas of Concern

These areas were identified by the community officials:

- Alkali Creek upstream of U.S. Highway 87
- City Wastewater and Water Treatment Plants (north of Belknap Ave, west of the Yellowstone River panel number 20).

Recommended Mitigation Measures

These recommendations have been developed as guidance for local community officials. They are not required actions. Rather, it is strongly suggested that when achievable, these recommendations be implemented.

Long Term Mitigation Solution

- a. Increase the public's awareness of flood hazards and correct construction practices. Elevate their knowledge of the flood-prone areas and describe techniques to reduce flood damages to existing structures. Reinforce the purchase of Federal Flood Insurance as a way of reducing the economic impact of a flood disaster.
- b. Enforce the flood damage reduction regulations in a more strict manner.

Recommended Mitigation Measures

1. Alkali Creek

- a. Encourage the purchase of Federal Flood Insurance by the owners of existing structures in or near the identified floodplain.
- b. Strictly enforce the City's Flood Damage Reduction Regulations for new construction and substantial improvements.
- c. Improve observation of Alkali Creek to better ensure compliance with regulations.

2. City Wastewater and Water Treatment Plant

- a. The City Wastewater Treatment Plant is protected by levees which have been approved by the USACE to protect against the 500-year flood (100-year flood elev. 3095 M.S.L., levee elev. 3099.25 M.S.L.).

b. The City Water Treatment Plant has some protection from developed road levees but these have not been approved by the USACE (100-year flood elev. 3108 M.S.L., estimated road/levee elev. 3110 M.S.L.).

c. Zone B flooding does affect a minimal amount of the treatment plant affecting settling ponds and does not create any health hazards.

*The City of Billings should apply to Federal Emergency Management Agency, Natural & Technical Hazards Division, Denver, Colorado for Letters of Map Amendment for any recent road crossings on Alkali Creek to redeliniate the floodplains.

Many of these new bridges were approved by the City after the State Floodplain Management Section recommended that they not be approved, because the bridges could not pass the 100-year flood flow.

Specific Areas of Concern

Yellowstone County

NFIP Community Number: 300142

FIRM Panel Number: 0001-1400

Effective Date: November 18, 1981

Existing Mitigation

-Flood Damage Reduction Regulations are being enforced by the Yellowstone County Disaster and Emergency Services Director.

-Intermittent riprap and bank shaping has occurred along the Yellowstone River and Clarks Fork Yellowstone River.

Areas of Concern

These areas were identified by the community officials:

-Continental (Conoco) and Exxon Oil Refineries along the Yellowstone River.

-Montana Power Company just north (downstream) of the City Water Treatment Plant.

-Blue Creek Subdivision, panel number 1020, the southeast corner of Section 20.

-Yellowstone Country Club and Cove Creek, panel 1005, southcentral of Section 30.

Recommended Mitigation Measures

These recommendations have been developed as guidance for the local community officials. They are not required actions. Rather, it is strongly suggested that when achievable, these recommendations be implemented.

Long Term Mitigation Solutions

- a. Increase the public awareness of flood hazards and correct construction practices. Elevate their knowledge of the flood-prone areas and describe techniques to reduce flood damages to existing structures. Reinforce the purchase of Federal Flood Insurance as a way of reducing the economic impact of a flood disaster.
- b. Continue to enforce the flood damage reduction regulations.

Recommended Mitigatin Measures

1. Continental Oil Refinery and Exxon Oil Refinery.
 - a. Continental Oil Refinery is on the west side of I-90 which protects the refinery from significant flooding (panel number 1010, northwest corner of Section 2).
 - b. Exxon Oil Refinery is on the south side of the Yellowstone River and is protected by levees and riprap (panel 1030, center of Section 24).
2. Montana Power Company is on the west side of the Yellowstone River and appears to be above the 100-year flood elevation (panel number 1010, center of Section 2). The 100-year flood elev. is 3108 M.S.L., the ground elev. at the plant site is 3108.24 M.S.L..
 - a. It was determined by Montana Power Plant personnel that up to two feet of surface flooding would not create any problems in power production or health hazards.

b. Provide water-tight seals on doors and other openings or adequate sand bags to prevent flood waters entering plant. Plant personnel have purchased approximately 4,000 sand bags and are storing them at the plant.

3. Blue Creek Subdivision is located between Blue Creek Road and Blue Creek. In 1978, the Blue Creek area received approximately seven inches of rain in a three day period which caused Blue Creek to leave its banks.

Levees have been placed along the creek in an attempt to protect the residential structures on the east side of the creek. These levees are not acceptable under USACE Levee Criteria.

- a. Investigate the feasibility of improving these levees to meet the USACE Levee Criteria.
- b. Encourage the purchase of Federal Flood Insurance by the home owners in the area.
- c. After the 1978 flood, one of the residents in this area lifted his home off its existing foundation and elevated his house approximately another four feet.

Encourage other residents to raise their houses in compliance to the County's Flood Damage Reduction Regulations.

- d. Ensure that adequate access and quantity of sand bags are available.

General Mitigation Recommendations

1. Existing Structures in Floodplain

- a. Encourage the purchase of Federal Flood Insurance to reduce the economic impact of the flood.
- b. Provide an adequate number of sand and bags to protect structure if flooding is not too severe.
- c. Develop and inform inhabitants of evacuation procedures and routes.
- d. Encourage the commercial structure owners located in the flood fringe to floodproof the structures so that the lowest habitable floor is protected at least two feet above the 100-year flood in compliance with the Flood Damage Reduction Regulations.
- e. Those homes in the floodway, if they should be destroyed, by any cause, prohibit the owner to rebuild in the floodway.
- f. Investigate the development of funds to purchase and remove any structures in the floodway and redevelop the property into a park or other open space use.

2. Bridges and Roads

- a. Identify the bridges that could wash away or be inundated by floodwaters.
- b. If the potential for destruction is high, attempt to rehabilitate the bridge or reconstruct the bridge to pass the 100-year flow.
- c. If access is blocked on a bridge or road, develop alternate evacuation routes and inform those residents who would be affected.

3. Yellowstone Country Club and Cove Creek are located on U.S. Highway 302, West of Billings.

Cove Creek runs through the Country Club after leaving a small retaining dam above the Club. This dam was washed out during the 1978 flood and hasn't been rebuilt. Now, any minor thunderstorm causes runoff to run directly down Cove Creek without retention.

The Creek also flows into the club sewage lagoon and then out again. The free flow action floods the lagoon.

- a. Investigate altering Cove Creek to prevent flow into sewage lagoon.
- b. Investigate rebuilding retention dams.
- c. Determine health hazard presented by sewage lagoon in creek area.